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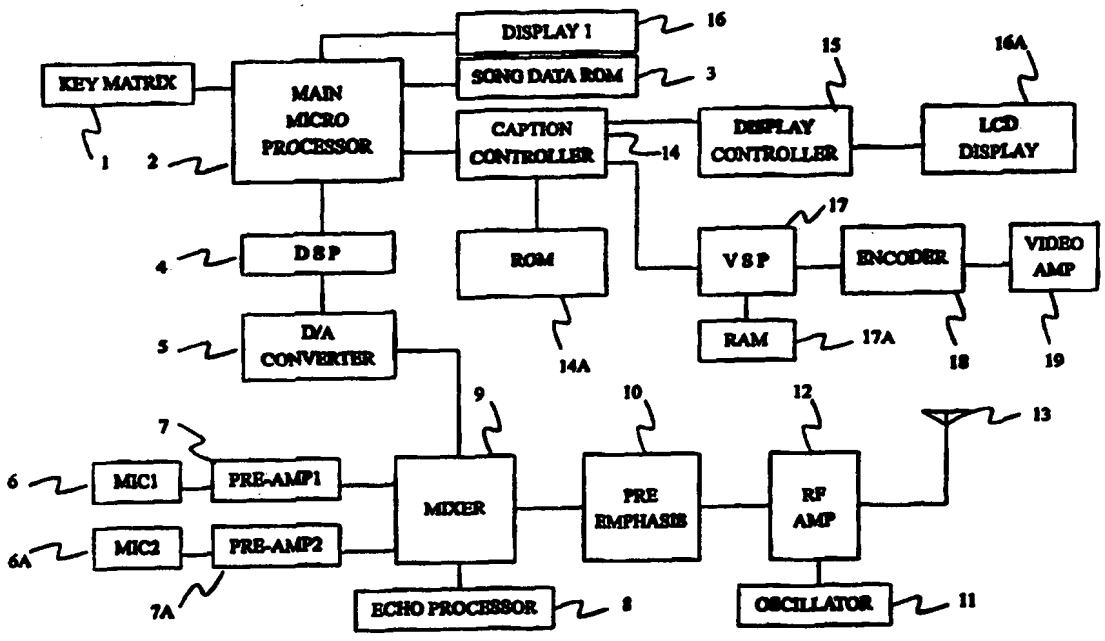

(57) Abstract

Provided is a portable caption display system for processing accompaniment data output from a main microprocessor controlling the entire operation of a system, mixing the voice input through an input means, and displaying the mixture through a video display means.

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PORTABLE CAPTION DISPLAY SYSTEM

Technical Field

The present invention relates to a portable caption display system, and more particularly, to a portable caption display system which, in case of utilizing a portable music player, helps a user to sing, reading the lyrics of a selected music by displaying the lyrics on a liquid crystal display device and simultaneously, while singing, to watch the background picture and lyrics by radio-transmitting video signals corresponding to the picture and lyrics through an additional video display means.

Background Art

A music playing system, KARAOKE, has been widely used in a sing-along room for providing its user with the selected song, its accompaniment and lyrics to thereby amuse the user.

That kind of portable music playing system is also described in Korean Patent Nos. 93-8475 and 93-27504. A number of accompaniment songs are recorded in ROM of the system. If a user selects the specificated number of a song, the system radio-transmits the corresponding accompaniment data through an antenna of a general audio system, so that the user can listen to the accompaniment through a speaker.

But the conventional portable music playing system is made to be used with an additional handbook showing the lyrics of the songs recorded in the ROM. Therefore, if the user does not know the words of the corresponding song, he/she cannot sing the song without the handbook.

Furthermore, a music player, which is distributed in a general sing-along room, is connected with a general video display means. Thus, if the user selects a song, the video tape recorder receives the video signals corresponding to the song's background and outputs the video and audio data of the lyrics as well as the accompaniment stored

in a memory such as ROM of the music player through a monitor or speaker.

But, the conventional music playing system displays the video signals including the lyrics and the background through a monitor in the state that data of the accompaniment, character data of the lyrics as well as the video data of the background are all stored up, and simultaneously outputs the accompaniment sound and user's voice through a speaker. Consequently, as the construction of the circuit is more complex and the size of the system becomes bigger due to the additional monitor and speaker, the system is not handy to carry.

Summary of the Invention

Accordingly, the present invention is directed to a portable caption display system that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a portable caption display system structured in such a manner that the main micro processor receiving the accompaniment data stored in a ROM according to the selection spec by a user displays the lyrics of the selected song on LCD and radio-transmits the mixture of the user's voice input from the microphone and the echo sound with the data of the background, thereby enabling the user to read lyrics through the LCD while using the portable caption display system, and to watch background including the lyrics through the additional video display means such as a monitor.

Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these and other advantages and in accordance with the purpose of

the present invention, as embodied and broadly described, a portable caption display system of the invention includes:

a key matrix for inputting the spec of a user, including a song selecting button from 0 to 9, a speed designating button for controlling the speed of the accompaniment, a pitch designating button for controlling the pitch of the song, an up/down control button for controlling the speed and pitch with a random value, a reset button for retrieving the system into the normal state when the system operates malfunctionally, a serial play button for playing the accompaniment song successively without an additional designation, an echo designating button for designating the intended echo effect from the voice while using a microphone, a song stop button for stopping the play of the song in order to change/reselect the song in the middle of playing the song, and a power button for supplying power of the built-in battery inside;

a main micro processor for receiving the spec of a user through the key matrix, analyzing it and controlling the entire operation including the accompaniment output and the caption display;

a digital signal processing unit for digitalizing the accompaniment data output from the main micro processor and outputting them;

a digital/analog converting unit for converting the digital signal of the accompaniment data output from the digital signal processing unit into analog signals and outputting them;

pre-amplifiers for amplifying two kinds of voices of the users input from two microphones respectively and outputting them;

a mixer for receiving the mixture of the voice signal output from the pre-amplifier and the echo sound selectively output from an echo generating unit, and mixing/outputting the mixture sound with the accompaniment sound from the digital/analog converting unit;

an output amplifier for amplifying the mixture signal of the voice output from

the mixer;

an RF-amplifier for modulating the signal output from a pre-emphasis unit to a carrier generated in an oscillator, amplifying it in high frequency and transmitting the modulated signal through an antenna;

a caption controller for reading out data corresponding to lyrics of the song stored in an inner non-volatile memory under the control of the main micro processor;

a second display unit for displaying video data output from the caption controller on LCD by characters or numbers;

a video signal processing unit for signal-processing the data output from the caption controller and outputting them into video signals;

an encoder for receiving the video signal output from the video signal processing unit and converting it into the coded signal combination; and

a video amplifier for amplifying the encoded signals.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

Brief Description of Drawings

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. 1 is a block diagram showing the entire structure of the invention;

FIG. 2 is a block diagram showing the structure of an accompaniment processing means of the invention;

FIG. 3 is a block diagram showing the structure of a sound input means of the invention; and

FIG. 4 is a block diagram showing the structure of a video output means of the

invention.

Best Mode for carrying Out the Invention

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

FIG. 1 illustrates the entire structure of an embodiment of the invention. As shown in FIG. 1, there is a key matrix 1 for inputting the spec of a user, including a song selecting button from 0 to 9; a speed designating button for controlling the speed of the accompaniment; a pitch designating button for controlling the pitch of the song; an up/down control button for controlling the speed and pitch with a random value; a reset button for retrieving the system into the normal state when the system operates malfunctionally; a serial play button for playing the accompaniment song successively without an additional designation; an echo designating button for designating the intended echo effect from the voice while using a wire/radio microphone; a song stop button for stopping the play of the song in order to change/reselect the song in the middle of playing the song; and a power button for supplying power of the built-in battery inside.

A main micro processor 2 receives the selection spec of the user through the key matrix 1, analyses the data and controls the entire operations including the accompaniment output and a caption display.

A song data ROM 3 outputs the accompaniment data corresponding to the selected song among accompaniments stored inside under the control of the main micro processor.

A digital signal processing unit(DSP) 4 converts the accompaniment data output through the main micro processor into the digital signal and outputs them.

A digital/analog (D/A) conver 5 converts the digital signal of the accompaniment output from the digital signal processing unit into the analog signal and

outputs them.

Pre-amplifiers (PRE-AMP1)(PRE-AMP2) 7 and 7A amplify the voice of the user input through the two microphones(MIC1)(MIC2) 6 and 6A respectively into a predetermined level and outputs them.

If the echo sound selectively output from an echo processor 8 is mixed with the voice signal output from the pre-amplifier and applied to a mixer 9, the mixer 9 mixes the sound with the accompaniment sound of the digital/analog converting unit 5.

A pre-emphasis 10 emphasizes the high frequency band and amplifies in order to modulates the voice signal mixture applied from the mixer with the high frequency.

A RF-amplifier (RF AMP) 12 modulates the voice signal mixture applied from the mixer 9 to the high frequency, reamplifies into high frequency and transmits the signal through an antenna.

A caption controller 14 reads and outputs the video data corresponding to the lyrics of the song stored in the ROM 14A under the control of the main micro processor.

A display controller 15 displays the video data output from the caption controller onto the second display unit such as a liquid crystal display(LCD) 16A by characters or numbers. Also, the video data can be outputted onto the first display unit (DISPLAY 1)16 as external video display such as monitor.

A video signal processing unit (VSP)17 treats the data output from the caption controller 14 and outputs them into the video signals.

An encoder 18 receives R. G. B. signals from the video signal processing unit, converts them into the combination of the coded signals and outputs the video signals through a video amplifier(VIDEO AMP) 19.

FIG. 2 illustrates the structure of the accompaniment processing means in the main micro processor.

CPU 2A of the main micro processor 2 receiving the spec of the user from the

key matrix through the data bus controls the internal operations according to the method and sequence stored in a program memory 2B and temporarily stores the operational data in SRAM 2C. CPU 2A reads the accompaniment data of the song selected by the user out of a plurality of ROMs 4A, 4B and 4C of a main memory 4 connected through the data bus and address bus and outputs them. CPU 2A displays the data selected through the key matrix by the user onto LCD 3A of the second display unit 3 by characters or number so that the user can read the data directly. The accompaniment data of the song output from CPU is digitalized in the digital signal processor(DSP) 5, converted into the analog signal via the digital/analog converter 6 and output.

FIG. 3 illustrates the structure of the voice input means. The voice signal of the user input through the wire or radio microphones 6 and 6A is amplified by the logic amplifier in the pre-amplifiers 7 and 7A. If the echo designating button of the key matrix is ON, the voice signals amplified in the pre-amplifiers are mixed with the echo sound applied from the echo processor 8 and amplified in the logic amplifiers OP3 and OP4. The voice signals with which the echo sound is selectively mixed are mixed in the mixer 9 after the accompaniment sound output from the digital/analog converting unit is amplified in the logic amplifiers OP5 and OP6. The mixture of the voice and accompaniment applied from the mixer 9 is high-frequency emphasized by the pre-emphasis 10, OP7 and OP8. Additionally, the RF-amplifier 12 modulates/high-frequency amplifies the signal output from the pre-emphasis 10 to the carrier generated in an oscillator 11 and transmitting the modulated signals through the antenna 13, thereby enabling the user to listen through the additional audio system.

FIG. 4 illustrates the structure of the video-signal output means of the invention.

The caption controller 14 controlled by the main micro processor 2 operates according to the method and sequence of the inner program memory 14A, reads the video data corresponding to the lyric and the background of the song stored in ROM 15

in the form of fonts, and outputs them while the data are temporarily stored in SRAM 14B. The caption controller 14 outputs the video data to the second display unit(LCD) 16A and displays the characters or numbers corresponding to the lyrics of the song selected by the user onto LCD 16A. The video signal processing unit(VSP) 17 receiving the video data output from the caption controller 14 temporarily stores them in RAM 17A and outputs them as of video signals. Thereafter, the encoder 18 receiving the video signals from the video signal processing unit (VSP)17 converts them into the coded signal combination and outputs them through the video amplifier 19, so that the user can see the characters and numbers of the lyrics through the monitor screen of the video display means.

The portable caption display system is structured in such a manner that the main micro processor receiving the selection spec by a user displays the number of the song onto the first display unit and radio-transmits the mixture of the user's voice input from the microphone and the echo sound while controlling the operations according to the accompaniment output and the caption display, and simultaneously the caption controller applies the video data corresponding to the lyrics onto the first display unit and externally outputs the video data corresponding to the lyrics and background through the video signal processing unit, thereby enabling the user to read lyrics through the LCD while using the portable caption display system, and to watch background including the lyrics through the additional video display means such as a monitor.

It will be apparent to those skilled in the art that various modifications and variations can be made in the portable caption display system of the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

Although the preferred embodiments of the present invention have been

disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as recited in the accompanying claims.

WHAT IS CLAIMED IS:

1. A portable caption display system for processing accompaniment data output from a main micro processor controlling the entire operation of a system, mixing the voice input through an input means, and displaying the mixture through a video display means.

2. The portable caption display system as claimed in claim 1, wherein the main micro processor outputs the accompaniment data for outputting the accompaniment sound and displaying caption.

3. The portable caption display system as claimed in claim 1, wherein the input means is a wire/radio microphone.

4. The portable caption display system as claimed in claim 1, wherein the video display means is a liquid crystal display.

5. The portable caption display system as claimed in claim 4, wherein the video display means is an external video display such as a monitor.

6. The portable caption display system as claimed in claim 1, further comprising: an amplifier for amplifying the voice input through the input means into a predetermined level.

7. The portable caption display system as claimed in claim 6, further comprising: a mixer for mixing the mixture of the voice signal from the amplifier and the echo sound from an echo generating unit with the accompaniment sound.

8. The portable caption display system as claimed in claim 7, wherein the echo sound from the echo generating unit can be output selectively.

9. The portable caption display system as claimed in claim 1, further comprising: a caption controller for outputting data corresponding to the lyrics of the song stored in a memory by the signal output form the micro processor.

10. The portable caption display system as claimed in claim 9, further comprising: a liquid crystal display substrate for displaying the video data output from the caption controller.

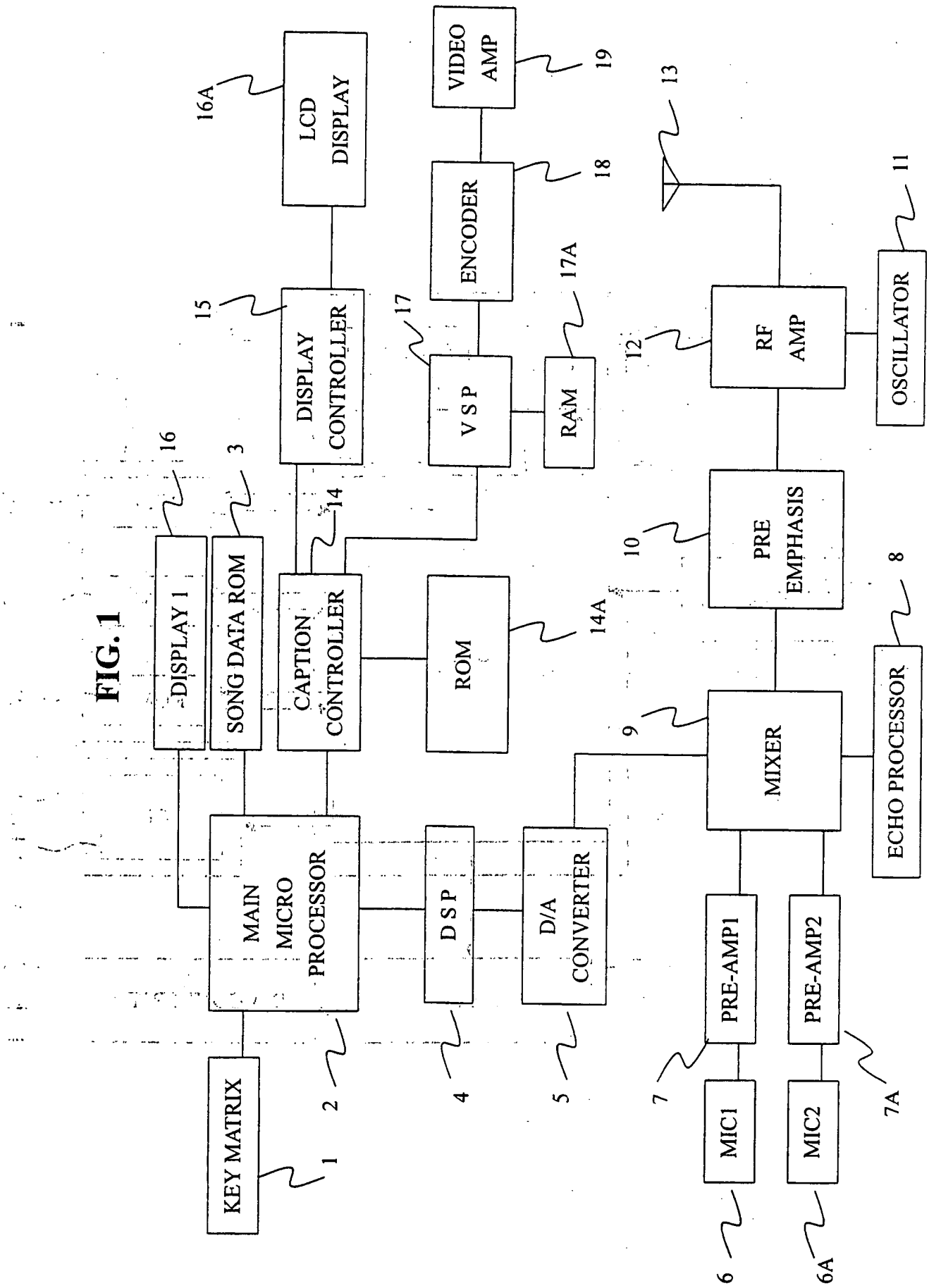
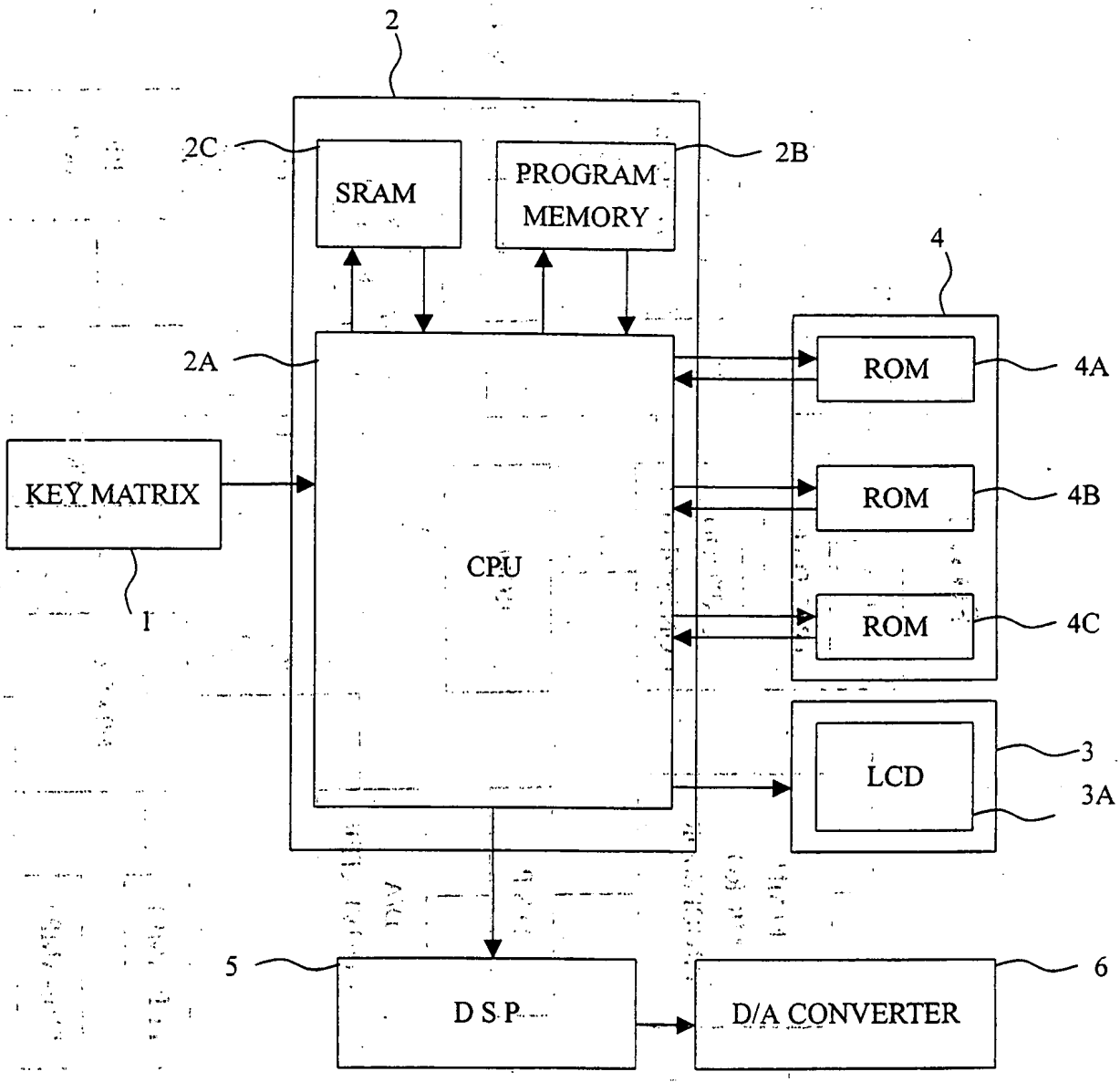

KEY MATRIX
1
MAIN MICRO PROCESSOR
2
D S P
4
D/A CONVERTER
5
MIC1
6
PRE-AMP1
7
MIC2
6A
PRE-AMP2
7A
MIXER
9
PRE EMPHASIS
10
RF AMP
12
OSCILLATOR
11
ECHO PROCESSOR
8
ROM
14A
CAPTION CONTROLLER
14
DISPLAY 1
16
SONG DATA ROM
3
DISPLAY CONTROLLER
15
LCD DISPLAY
16A
V S P
17
RAM
17A
ENCODER
18
VIDEO AMP
19
13

FIG. 1

FIG. 2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2C
SRAM
PROGRAM MEMORY
2B
4
2A
ROM
4A
KEY MATRIX
ROM
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CPU
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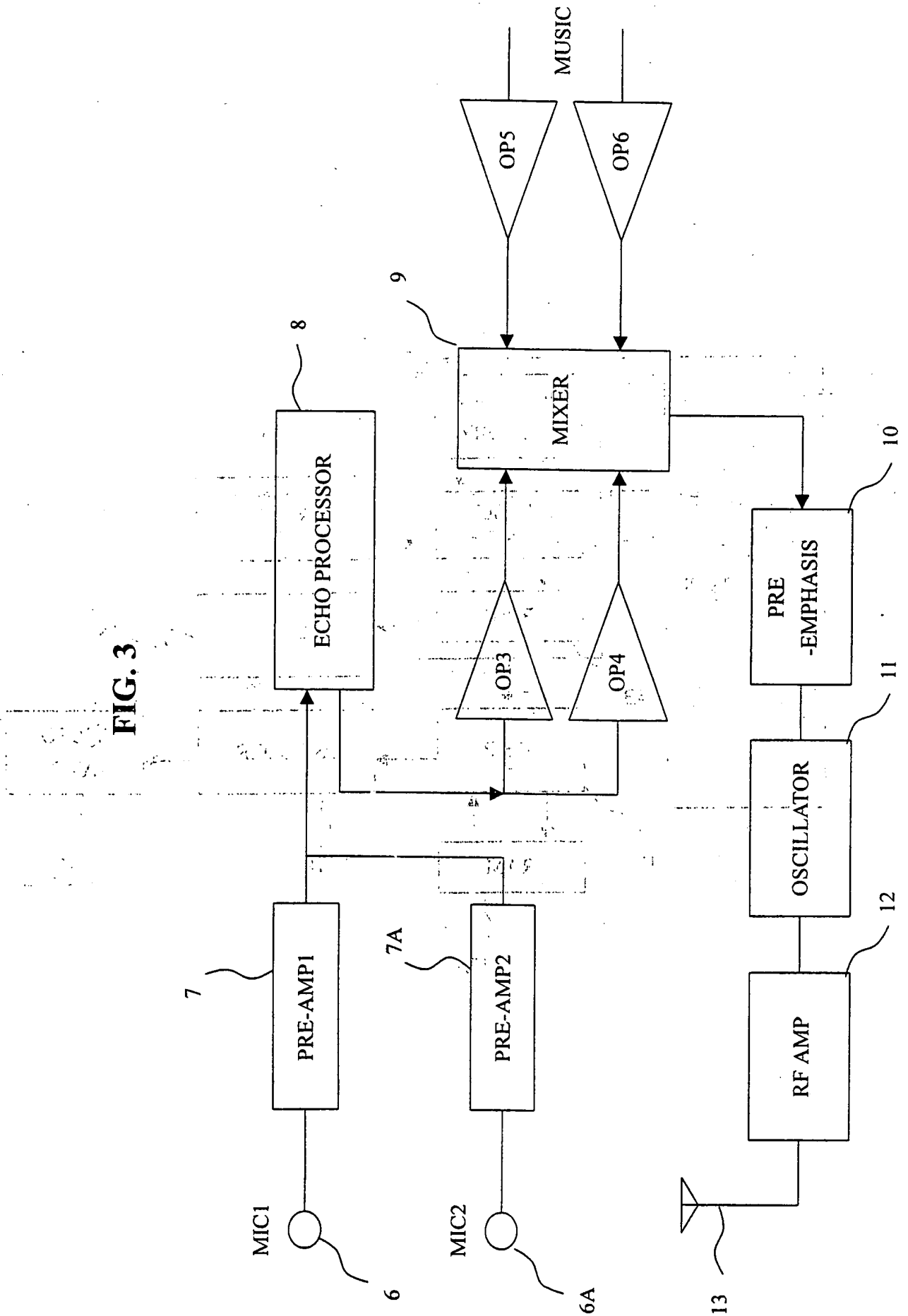
3
3A
5
D S P
D/A CONVERTER
6

FIG. 3


MUSIC
OP5
OP6
9
MIXER
8
ECHO PROCESSOR
OP3
OP4
10
PRE
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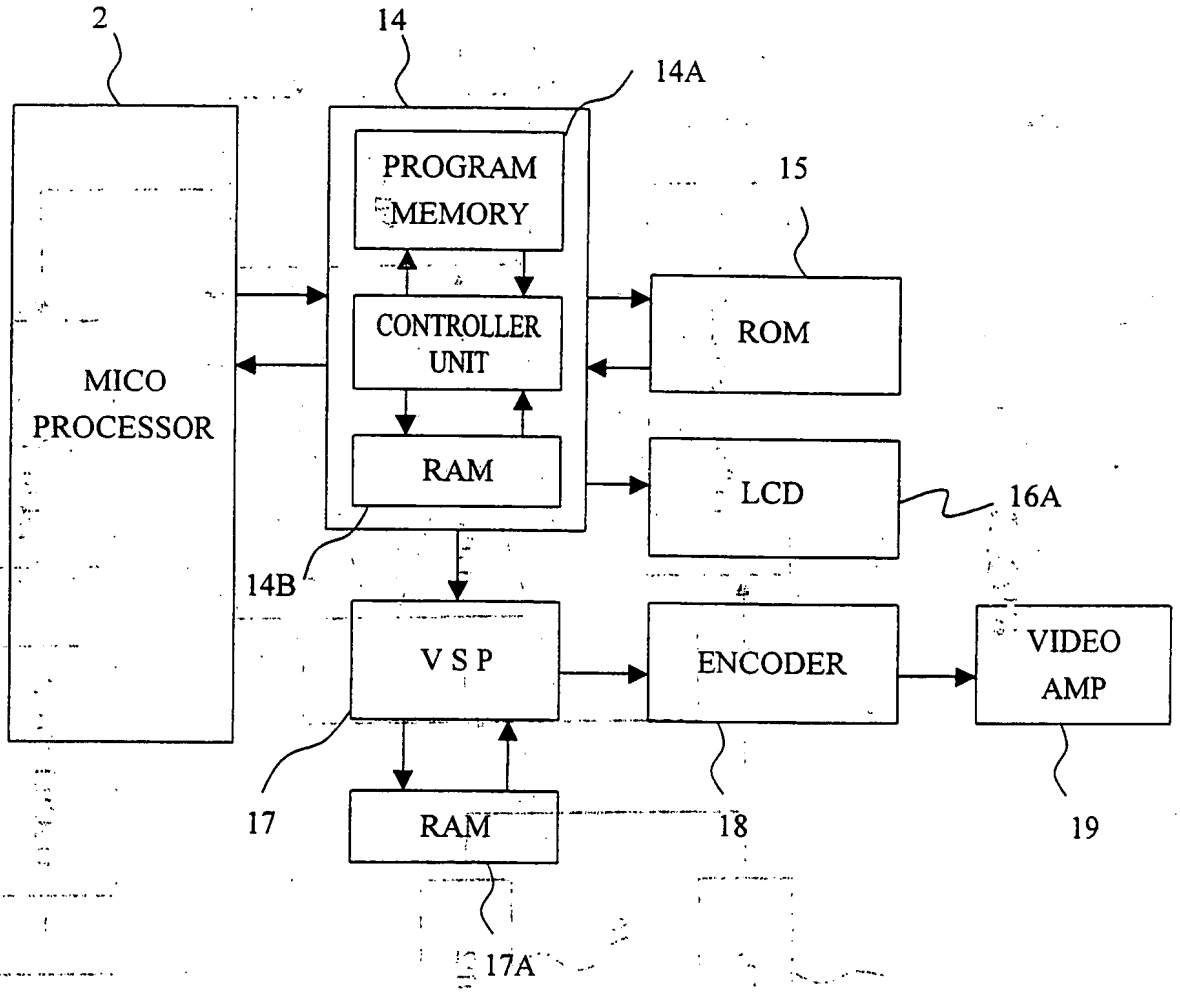
OSCILLATOR
12
RF AMP
13
7
PRE-AMP1
7A
PRE-AMP2
MIC1
MIC2
6
6A

FIG. 4


2
14
14A
PROGRAM MEMORY
15
CONTROLLER UNIT
ROM
MICO PROCESSOR
RAM
LCD
16A
14B
V S P
ENCODER
VIDEO AMP
17
RAM
18
19
17A

INTERNATIONAL SEARCH REPORT

Intei. ..ional application No.
PCT/KR 98/00263

A. CLASSIFICATION OF SUBJECT MATTER

IPC[6]: G 10 K 15/04; G 10 G 3/04
According to International Patent Classification (IPC) or to both national classification and IPC

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Minimum documentation searched (classification system followed by classification symbols)

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EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 509 766 A2 (PIONEER) 21 October 1992 (21.10.92), claim 1; fig.2.	1
P,A	EP 0 806 758 A1 (MARUSHO) 12 November 1997 (12.11.97), claims 1-4,9; fig. 1.	1-4
A	EP 0 675 666 A1 (ARTIF) 04 October 1995 (04.10.95), claims 1-4; fig. 1.	1-4
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A	JP-09-152 875 A (BROTHER) 10 June 1997 (10.06.97), abstract; fig.	1
A	JP-09-081 164 A (KOKUSAI) 28 March 1997 (28.03.97), abstract; fig.	1

[ ] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
05 November 1998 (05.11.98)	11 Dezember 1998 (11.12.98)
Name and mailing address of the ISA/ Austrian Patent Office Kohlmarkt 8-10; A-1014 Vienna Facsimile No. 1/53424/535	Authorized officer Mihatsek Telephone No. 1/53424/329

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PCT/KR 98/00263

Im Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
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EP A1 806758	12-11-97	keine - none - rien	
EP A1 675666	04-10-95	AU A1 15066/95 BR A 9501256 CN A 1118104 GB A0 9501815 GB A1 2288054 GB B2 2288054 NO A0 951237 NO A 951237 NZ A 270739 SG A1 32324 ZA A 9502348 US A 5606143	12-10-95 05-12-95 06-03-96 22-03-95 04-10-95 08-04-98 30-03-95 02-10-95 29-01-97 13-08-96 24-01-96 25-02-97
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JP A2 9152875	10-06-97	keine - none - rien	
JP A2 9081164	28-03-97	keine - none - rien	